What is claimed is:

1. A differential circuit that reduces or eliminates even order harmonic distortion comprising:

a first active circuit element having an input and an output;

a second active circuit element having an input and an output;

a first pair of impedances connected in series with respect to each other and coupled with a first common node disposed therebetween, said first pair of impedances connected between respective outputs of said first and second active circuit elements;

a second pair of impedances connected in series with respect to each other and coupled with a second common node disposed therebetween, said second pair of impedances connected between respective inputs of said first and second active circuit elements;

a feedback connection connected between said first common node and said second common node;

a balun having first and second windings, the first winding of said balun being connected to said output of one of said first and second active circuit elements other than through said first pair of impedances, and the second winding of said balun being connected to said output of another of said first and second active circuit elements other than through said first pair of impedances; and

whereby when respective signals are applied to said inputs of said first and second active circuit elements, said input and output of said second active circuit element are respectively substantially out of phase with respect to said input and output of said first active circuit element.

2. The differential circuit as claimed in claim 1, wherein a phase shift around an interconnected first loop defined by said first active circuit element, corresponding ones of said first and second impedances, and said feedback connection substantially equals 180?; and

a phase shift around an interconnected second loop defined by said second active circuit element, corresponding ones of said first and second impedances, and said feedback connection substantially equals 180?.

3. The differential circuit as claimed in claim 1 wherein said first pair of impedances are passive.

4. The differential circuit as claimed in claim 1 wherein said second pair of impedances are passive.

5. The differential circuit as claimed in claim 1 wherein each impedance of one of said first and second pairs of impedances comprises a parallel combination of resistive and capacitive (R-C) components.

6. The differential circuit as claimed in claim 1 wherein said feedback connection is passive.

7. The differential circuit as claimed in claim 1 wherein said feedback connection comprises a third active circuit element having an input and output, said input of said third active circuit element being connected to said first common node, and said output of said third active circuit element being connected to said second common node.

8. The differential circuit as claimed in claim 1 wherein said first winding of said balun is connected between a non-grounded output signal terminal and said output of said one of said first and second active circuit elements, and the second winding of said balun is connected between a grounded connection and said output of said another of said first and second active circuit elements.

9. The differential circuit as claimed in claim 1 further comprising another balun having first and second windings connected to respective inputs of said first and second active circuit elements.

10. The differential circuit as claimed in claim 9 wherein said first winding of said another balun is connected between an input signal source and said input of one of said first

and second active circuit elements other than through said second pair of impedances, and said second winding of said another balun is connected between a grounded connection and said input of another of said first and second active circuit elements other than through said second pair of impedances.

11. The differential circuit as claimed in claim 9 wherein said balun and said another balun are connected diagonally symmetrically such that said first winding of said balun is connected between a non-grounded output signal terminal and said output of said one of said first and second active circuit elements and said first winding of said another balun is connected between a non-grounded input signal source and said input of said another of said first and second active circuit elements.

12. A push-pull amplifier system comprising the differential circuit as claimed in claim 1.

13. A frequency up-converter system comprising the differential circuit as claimed in claim 1.

14. A differential circuit that reduces or eliminates even order harmonic distortion comprising:

a first active circuit element having an input and an output;

a second active circuit element having an input and an output;

a first pair of impedances connected in series with respect to each other and coupled with a first common node disposed therebetween, said first pair of impedances connected between respective outputs of said first and second active circuit elements;

a second pair of impedances connected in series with respect to each other and coupled with a second common node disposed therebetween, said second pair of impedances connected between respective inputs of said first and second active circuit elements;

a feedback connection connected between said first common node and said second common node;

wherein a selected pair of said first pair of impedances and said second pair of impedances comprises an electronically controlled circuit for varying a degree of imbalance between respective impedances of said selected pair of impedances; and

whereby when respective signals are applied to said inputs of said first and second active circuit elements, said input and output of said second active circuit element are respectively substantially out of phase with respect to said input and output of said first active circuit element.

15. The differential circuit as claimed in claim 14, wherein said electronically controlled circuit further comprises PIN diodes and varactor diodes connected in a back-to-back arrangement with a common ground return.

16. A differential circuit that reduces or eliminates even order harmonic distortion comprising:

a first active circuit element having an input and an output;

a second active circuit element having an input and an output;

a first pair of impedances connected in series with respect to each other and coupled with a first common node disposed therebetween, said first pair of impedances connected between respective outputs of said first and second active circuit elements;

a second pair of impedances connected in series with respect to each other and coupled with a second common node disposed therebetween, a first end of said series connected second pair of impedances and an output of one of said first and second active circuit elements being connected to respective inputs of a first combiner or directional coupler, and a second end of said series connected second pair of impedances and an output of another of said second active circuit elements being connected to respective inputs of a second combiner or directional coupler; and

a feed-forward connection connected between said first common node and said second common node; and

whereby when respective signals are applied to said inputs of said first and second active circuit elements, corresponding outputs of said first and second active circuit elements are substantially out of phase with respect to each other.

17. The differential circuit as claimed in claim 16 wherein said first pair of impedances are passive.

18. The differential circuit as claimed in claim 16 wherein said second pair of impedances are passive.

19. The differential circuit as claimed in claim 16 wherein said first and second combiners are direct connections.

20. The differential circuit as claimed in claim 16 wherein each impedance of one of said first and second pairs of impedances comprises a parallel combination of resistive and capacitive (R-C) components.

21. The differential circuit as claimed in claim 16 wherein said feed-forward connection is passive.

22. The differential circuit as claimed in claim 16 wherein said feed-forward connection comprises a third active circuit element having an input and output, said input of said third active circuit element being connected to said first common node, and said output of said third active circuit element being connected to said second common node.

23. The differential circuit as claimed in claim 16 further comprising a balun having first and second windings connected to respective outputs of said first and second combiners or directional couplers.

24. The differential circuit as claimed in claim 23 wherein said first winding of said balun is connected between an output signal terminal and said output of one of said first and second combiners or directional couplers, and said second winding of said balun is connected between a grounded connection and said output of another of said first and second combiners or directional couplers.

25. The differential circuit as claimed in claim 16 further comprising a balun having first and second windings connected to respective inputs of said first and second active circuit elements.

26. The differential circuit as claimed in claim 25 wherein said first winding of said balun is connected between an input signal source and said input of one of said first and second active circuit elements, and said second winding of said balun is connected between a grounded connection and said input of another of said first and second active circuit elements.

27. The differential circuit as claimed in claim 16 further comprising first and second baluns each having a pair of windings and connected diagonally symmetrically such that one of said pair of windings of said first balun is connected between a non-grounded input signal source and said input of one of said first and second active circuit elements, and one of said pair of windings of said second balun is connected between a non-grounded output signal terminal and said output of said combiner or directional coupler that has one of its input connected to said output of another of said first and second active circuit elements.

28. A push-pull amplifier system comprising the differential circuit as claimed in claim 16.

29. A frequency up-converter system comprising the differential circuit as claimed in claim 16.

30. A differential circuit that reduces or eliminates even order harmonic distortion comprising:

a first active circuit element having an input and an output;

a second active circuit element having an input and an output;

a pair of impedances connected in series with respect to each other and coupled with a common node disposed therebetween, said pair of impedances connected between respective outputs of said first and second active circuit elements;

first and second baluns, each having a pair of windings, respectively connected to said inputs and said outputs of said first and second active circuit elements, said first and second baluns being connected diagonally symmetrically such that one of said pair of windings of said first balun is connected between a non-grounded input signal source and said input of one of said first and second active circuit elements, and one of said pair of windings of said second balun is connected between said output of another of said first and second active circuit elements and a first input of a combiner or directional coupler having an output connected to a non-grounded output signal terminal; and

further comprising:

a third active circuit element having an input connected to said common node and an output connected to a second input of said combiner or directional coupler; and

whereby when respective signals are applied to said pair of windings of said first balun, said outputs of said first and second active circuit element are respectively substantially out of phase with respect to each other.

31. The differential circuit as claimed in claim 30 wherein said third active circuit element is amplitude adjustable.

32. The differential circuit as claimed in claim 30 further comprising a phase control connected between said common node and said input of said third active circuit element whereby a phase of a signal provided from said common node to said third active element can be adjusted.

33. A differential circuit that reduces or eliminates even order harmonic distortion comprising:

a first active circuit element having an input and an output;

a second active circuit element having an input and an output;

a first pair of impedances connected in series with respect to each other and coupled with a first common node disposed therebetween, said first pair of impedances connected between respective outputs of said first and second active circuit elements;

a second pair of impedances connected in series with respect to each other and coupled with a second common node disposed therebetween, a first end of said series connected second pair of impedances and an output of one of said first and second active circuit elements being connected to respective inputs of a first combiner or directional coupler, and a second end of said series connected second pair of impedances and an output of another of said second active circuit elements being connected to respective inputs of a second combiner or directional coupler;

a feed-forward connection connected between said first common node and said second common node;

wherein a selected pair of said first pair of impedances and said second pair of impedances comprises an electronically controlled circuit for varying a degree of imbalance between respective impedances of said selected pair of impedances; and

whereby when respective signals are applied to said inputs of said first and second active circuit elements, said input and output of said second active circuit element are respectively substantially out of phase with respect to said input and output of said first active circuit element.

34. The differential circuit as claimed in claim 31, wherein said electronically controlled circuit further comprises PIN diodes and varactor diodes connected in a back-to-back arrangement with a common ground return.

35. A method for reducing or eliminating even order harmonic distortion comprising:

providing a first active circuit element having an input and an output;

providing a second active circuit element having an input and an output;

providing a first pair of impedances connected in series with respect to each other and coupled with a first common node disposed therebetween, said first pair of impedances connected between respective outputs of said first and second active circuit elements, and a second pair of impedances connected in series with respect to each other and coupled with a second common node disposed therebetween, said second pair of impedances connected between respective inputs of said first and second active circuit elements;

providing a feedback connection between said first common node and said second common node;

providing a balun having first and second windings, the first winding of said balun being connected to said output of one of said first and second active circuit elements other than through said first pair of impedances, and the second winding of said balun being connected to said output of another of said first and second active circuit elements other than through said first pair of impedances;

applying respective signals to said inputs of said first and second active circuit elements, whereby said input and output of said second active circuit element are respectively substantially out of phase with respect to said input and output of said first active circuit element; and

feeding a correction signal having no fundamental signal energy from said first common node to said second common node thereby reducing or eliminating even order harmonic distortion.

36. The method as claimed in claim 36 further comprising varying a degree of imbalance between respective impedances of a selected pair of said first pair of impedances and said second pair of impedances.

37. A method for reducing or eliminating even order harmonic distortion comprising:

providing a first active circuit element having an input and an output;

providing a second active circuit element having an input and an output;

providing a first pair of impedances connected in series with respect to each other and coupled with a first common node disposed therebetween, said first pair of impedances connected between respective outputs of said first and second active circuit elements, and a second pair of impedances connected in series with respect to each other and coupled with a second common node disposed therebetween, said second pair of impedances connected between respective inputs of said first and second active circuit elements;

providing a feedback connection between said first common node and said second common node;

applying respective signals to said inputs of said first and second active circuit elements, whereby said input and output of said second active circuit element are respectively substantially out of phase with respect to said input and output of said first active circuit element;

varying a degree of imbalance between respective impedances of a selected pair of said first pair of impedances and said second pair of impedances; and

feeding a correction signal having no fundamental signal energy from said first common node to said second common node thereby reducing or eliminating even order harmonic distortion.

38. A method for reducing or eliminating even order harmonic distortion comprising:

providing a first active circuit element having an input and an output;

providing a second active circuit element having an input and an output;

providing a first pair of impedances connected in series with respect to each other and coupled with a first common node disposed therebetween, said first pair of impedances connected between respective outputs of said first and second active circuit elements, and a second pair of impedances connected in series with respect to each other and coupled with a second common node disposed therebetween, a first end of said series connected second pair of impedances and an output of one of said first and second active circuit elements being connected to respective inputs of a first combiner or directional coupler, and a second end of said series connected second pair of impedances and an output of another of said second active circuit elements being connected to respective inputs of a second combiner or directional coupler;

providing a feed-forward connection connected between said first common node and said second common node;

applying respective signals to said inputs of said first and second active circuit elements, whereby said outputs of said first and second active circuit elements are substantially out of phase with respect to each other;

feeding a correction signal having no fundamental signal energy from said first common node to said second common node; and

summing said correction signal with respective output signals from said first and second active circuit elements thereby reducing or eliminating even order harmonic distortion.

39. The method as claimed in claim 38 further comprising varying a degree of imbalance between respective impedances of a selected pair of said first pair of impedances and said second pair of impedances.

40. A method for reducing or eliminating even order harmonic distortion comprising:

providing a first active circuit element having an input and an output;

providing a second active circuit element having an input and an output;

providing a pair of impedances connected in series with respect to each other and coupled with a common node disposed therebetween, said pair of impedances connected between respective outputs of said first and second active circuit elements;

providing first and second baluns, each having a pair of windings, respectively connected to said inputs and said outputs of said first and second active circuit elements, said first and second baluns being connected diagonally symmetrically such that one of said pair of windings of said first balun is connected between a non-grounded input signal source and said input of one of said first and second active circuit elements, and one of said pair of windings of said second balun is connected between said output of another of said first and second active circuit elements and a first input of a combiner or directional coupler having an output connected to a non-grounded output signal terminal;

providing a third active circuit element having an input connected to said common node and an output connected to a second input of said combiner or directional coupler;

applying respective signals to said pair of windings of said first balun whereby corresponding output signals of said first and second active circuit element are respectively substantially out of phase with respect to each other; and

summing a correction signal from said output of said third active circuit element with a signal from said end of said pair of windings of said second balun that is connected to said first input of said combiner or directional coupler.

41. The method as claimed in claim 40 further comprising varying a gain of said third active circuit element.

42. The method as claimed in claim 40 further comprising varying a phase of a signal from said common node to said input of said third active circuit element.